

REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections and the comments relative thereto. Favorable reconsideration of the application is respectfully requested in light of the following detailed arguments.

Claims 17, 19-22 and 28-42 are pending in this application. A request for a three month extension of time, with the appropriate fee, has been submitted herewith.

REJECTIONS UNDER 35 USC §103

Claims 17, 19-22 and 28-42 were again rejected under 35 USC §103 as being unpatentable over US Patent 4,190,698 to De Boel, and further in view of Varma (Pub WO/2002/024445).

Before discussing the prior art, applicant would like to point out for the Examiner's convenience features of the present invention. The present invention, as defined in amended claim 17, relates to a clear intumescent interlayer produced by drying a clear stable aqueous solution comprising an alkali metal silicate waterglass, a water soluble aluminate and a hydroxy carboxylic acid under controlled conditions. The aluminate has been partially neutralized by the hydroxyl carboxylic acid prior to its introduction to the silicate to prevent formation of a precipitate. The interlayer comprises from 10 to 35% by weight of water.

De Boel discloses a light-transmitting fire screening panel comprising at least one sheet of glass and at least one layer of intumescent material. In the layer a hydrated alkali metal silicate is used as intumescent material and one or more adjuvants selected from: urea, polyhydric alcohol (including glycerine, ethylene glycol and sorbitol), monosaccharide (including glucose), polysaccharide (including starch), sodium phosphate, sodium aluminate, aluminum phosphate, borax, boric acid and colloidal silica.

The Examiner's attention is directed to the attached declaration from inventor John Richard Holland. In this declaration, the declarant gives evidence for the statement "we have discovered that the addition of sodium aluminate to a waterglass solution as proposed in USP 4190698 does not produce a solution which is useful in the

formation of fire resistant glazings" which was made in the original application and which is argued herein.

The experimental results shown in the declaration support the statement in the application which is quoted in paragraph 6 of the declaration and repeated above. The Examples which form part of the application show that the addition of citric acid to these formulations leads to the formation of a clear solution which can be dried to form a clear interlayer useful as a component of a fire resistant glazing.

Varma discloses the advantages which accrue from the addition of certain hydroxy carboxylic acids including citric acid to an aqueous silicate solution in the production of fire resistant glazings. Varma is silent as to the incorporation of multivalent metal ions into the silicate solution. The solutions and interlayers disclosed by Varma can be clearly seen to be different from those disclosed in the present application.

The Examiner rejects the claims of this application as being obvious over De Boel in view of Varma. This rejection is based upon what is asserted to be a misunderstanding of the claimed invention. In the art of fire resistant glazing there has long been a belief that the incorporation of multivalent metal ions would lead to an interlayer which would exhibit improved fire resistant properties. This is reflected by the statement at column 3 line 7 of De Boel "sodium aluminate has a favourable effect in that it also increases the refractiveness of the layer." This belief persisted in the art as can be seen in the disclosure of US Patent 5,766,770 (Nolte) at column 3 line 14 which states: "It has been found to be advantageous to introduce sub microscopic particles of at least one inorganic compound of Si, Al, Ti or Zr for increasing the viscosity of said layer upon foaming thereof in case of exposure to a fire". Neither De Boel or Nolte provide a disclosure which enables this belief to be practiced. As demonstrated by the experiments reported above simply following the teaching of De Boel leads to the formation of a turbid interlayer which is of no value, and certainly does not lead one to the purpose of the present invention.

As noted in the declaration, it is notoriously well known in the field that the addition of aluminium compounds dramatically reduces the solubility of silicates. Synthetic zeolitic minerals can be produced simply by mixing sodium silicate and

sodium aluminate in a wide range of ratios and concentrations. This is the inevitable result if the teaching of De Boel is followed. These materials have extremely low solubility in aqueous solutions so a precipitate will be the result. It is therefore evident that in light of this one skilled in the art would not have anticipated anything else, and these experiments were not carried out.

It is respectfully submitted that the present invention overcomes this difficulty. It provides a method by which aluminium ions can be incorporated into a clear silicate based interlayer which comprises partially neutralizing sodium aluminate using a hydroxy carboxylic acid such as citric acid. Varma does not address this problem of incorporating a multivalent metal ion into the silicate. There is no motivation for one skilled in the art to look to Varma in order to solve the problem of incorporating multivalent metal ions.

There is nothing in the De Boel reference to suggest this partial neutralization, nor is there any reason for one skilled in the art to modify De Boel in this manner. De Boel does not suggest that the components would have been added in any particular order, nor that this partial neutralization occurs. It is further submitted that nothing in the Varma reference would overcome this deficiency of De Boel. It is only through the teachings of the present invention that this partial neutralization, to prevent the formation of precipitates, would have taken place prior to the introduction of the aluminate to the silicate.

Based upon the above, it is respectfully submitted that independent claim 17 distinguishes over the applied art of record. The remaining claims depend, directly or indirectly from independent claim 17 and are believed to be allowable based, at least, upon this dependence.

In view of the above it is respectfully submitted that the rejections of the claims under 35 USC §103 have been overcome. Rejection and withdrawal of the pending rejections are therefore respectfully requested.

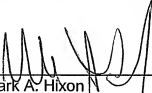
SUMMARY

For the reasons above, it is submitted that independent claim 17 is allowable over the applied art of record. The remaining claims depend directly or indirectly from

claim 17, and are believed to be allowable based, at least, upon their dependence from this allowable base claim as shown above.

Should the Examiner wish to modify any of the language of the claims, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



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